

the satellite's orbit. The opportunities for observing the conjunctions of the satellite with the centre of the planet (when it may be preferable to observe position-angles and distances) should not be missed, especially those of the closer conjunctions, Nov. 8-9, and Dec. 17-18.

Ephemeris of the Satellite of Neptune, 1888-89. By A. Marth.

| Greenwich Noon. 1888. | P' | a | b | u-U | Diff. | U | B |
|-----------------------------|--------|--------|-------|--------|--------|--------|--------|
| Oct. 19 | 324°79 | 16''87 | 8''52 | 264°32 | 612°35 | 129°20 | -30°30 |
| 29 | 324°58 | 16'92 | 8'52 | 156'67 | 31 | 129°45 | 30°21 |
| Nov. 8 | 324°36 | 16'96 | 8'51 | 48'98 | 28 | 129°73 | 30°11 |
| 18 | 324°12 | 16'97 | 8'48 | 301'26 | 27 | 130°02 | 30°00 |
| 28 | 323°88 | 16'97 | 8'45 | 193'53 | 27 | 130°32 | 29°88 |
| Dec. 8 | 323°64 | 16'95 | 8'41 | 85'80 | 28 | 130°61 | 29°76 |
| 18 | 323°42 | 16'91 | 8'37 | 338'08 | 29 | 130°88 | 29°65 |
| 28 | 323°23 | 16'86 | 8'31 | 230'37 | 33 | 131°11 | 29°55 |
| 1889. | | | | | | | |
| Jan. 7 | 323°07 | 16'79 | 8'26 | 122'70 | 612°37 | 131°31 | -29°47 |
| 17 | 322°95 | 16'71 | 8'20 | 15'07 | 42 | 131°46 | 29°40 |
| 27 | 322°87 | 16'62 | 8'14 | 267'49 | 48 | 131°55 | 29°35 |
| Feb. 6 | 322°84 | 16'53 | 8'09 | 159'97 | 53 | 131°59 | 29°32 |
| 16 | 322°86 | 16'43 | 8'05 | 52'50 | 59 | 131°56 | 29°32 |
| 26 | 322°92 | 16'34 | 8'01 | 305'09 | 65 | 131°48 | 29°34 |
| Mar. 8 | 323°03 | 16'25 | 7'97 | 197'74 | 71 | 131°34 | 29°39 |
| 18 | 323°19 | 16'16 | 7'95 | 90'45 | 612°76 | 131°14 | 29°36 |
| 28 | 323°39 | 16'09 | 7'93 | 243'21 | | 130°89 | 29°55 |

P' position-angle of the minor axis of the satellite's apparent orbit, in the direction of superior conjunction.

a, b, major and minor semi-axes of the apparent orbit.

u-U, longitude of the satellite in its orbit, reckoned from the point which is in superior conjunction with the planet or in opposition to the earth.

U + 180°, planetocentric longitude of the earth, reckoned in the satellite's orbit from the ascending node on the celestial equator.

B, planetocentric latitude of the earth above the plane of the orbit.

The values of u-U, P', a, b are to be interpolated directly for the times for which the apparent positions of the satellite are required, and the position-angles p and distances s of the satellite are then found by means of the formulæ

$$\begin{aligned} s \sin (P' - p) &= a \sin (u - U) \\ s \cos (P' - p) &= b \cos (u - U). \end{aligned}$$

Sup. 1888.

Mr. Marth, *Satellite of Neptune.*

411

The satellite moves in the direction of decreasing position-angles, and will be at its greatest elongations (*nf* in pos. $P' + 90^\circ$, *sp* in pos. $P' - 90^\circ$ at distance a), and at its conjunctions (*superior* in pos. P' , *inferior* in pos. $P' + 180^\circ$ at distance b) at the following Greenwich times :

| 1888. | h | | 1888. | h | | 1889. | h | |
|---------|------|------|---------|------|------|--------|------|------|
| Oct. 29 | 9.1 | inf. | Dec. 19 | 19.9 | sp. | Feb. 7 | 19.1 | nf. |
| 30 | 20.4 | nf. | 21 | 7.1 | inf. | 9 | 6.4 | sup. |
| Nov. 1 | 7.7 | sup. | 22 | 18.4 | nf. | 10 | 17.6 | sp. |
| 2 | 18.9 | sp. | 24 | 5.7 | sup. | 12 | 4.9 | inf. |
| 4 | 6.2 | inf. | 25 | 17.0 | sp. | 13 | 16.2 | nf. |
| 5 | 17.5 | nf. | 27 | 4.3 | inf. | 15 | 3.4 | sup. |
| 7 | 4.8 | sup. | 28 | 15.5 | nf. | 16 | 14.7 | sp. |
| 8 | 16.1 | sp. | 30 | 2.8 | sup. | 18 | 1.9 | inf. |
| 10 | 3.4 | inf. | 31 | 14.1 | sp. | 19 | 13.2 | nf. |
| 11 | 14.6 | nf. | 1889. | | | 21 | 0.5 | sup. |
| 13 | 1.9 | sup. | Jan. 2 | 1.4 | inf. | 22 | 11.7 | sp. |
| 14 | 13.2 | sp. | 3 | 12.6 | nf. | 23 | 23.0 | inf. |
| 16 | 0.5 | inf. | 4 | 23.9 | sup. | 25 | 10.3 | nf. |
| 17 | 11.7 | nf. | 6 | 11.2 | sp. | 26 | 21.5 | sup. |
| 18 | 23.0 | sup. | 7 | 22.5 | inf. | 28 | 8.8 | sp. |
| 20 | 10.3 | sp. | 9 | 9.7 | nf. | Mar. 1 | 20.0 | inf. |
| 21 | 21.6 | inf. | 10 | 21.0 | sup. | 3 | 7.3 | nf. |
| 23 | 8.9 | nf. | 12 | 8.3 | sp. | 4 | 18.5 | sup. |
| 24 | 20.1 | sup. | 13 | 19.5 | inf. | 6 | 5.8 | sp. |
| 26 | 7.4 | sp. | 15 | 6.8 | nf. | 7 | 17.0 | inf. |
| 27 | 18.7 | inf. | 16 | 18.1 | sup. | 9 | 4.3 | nf. |
| 29 | 6.0 | nf. | 18 | 5.4 | sp. | 10 | 15.6 | sup. |
| 30 | 17.3 | sup. | 19 | 16.6 | inf. | 12 | 2.8 | sp. |
| Dec. 2 | 4.5 | sp. | 21 | 3.9 | nf. | 13 | 14.1 | inf. |
| 3 | 15.8 | inf. | 22 | 15.2 | sup. | 15 | 1.3 | nf. |
| 5 | 3.1 | nf. | 24 | 2.4 | sp. | 16 | 12.6 | sup. |
| 6 | 14.4 | sup. | 25 | 13.7 | inf. | 17 | 23.8 | sp. |
| 8 | 1.6 | sp. | 27 | 1.0 | nf. | 19 | 11.1 | inf. |
| 9 | 12.9 | inf. | 28 | 12.2 | sup. | 20 | 22.3 | nf. |
| 11 | 0.2 | nf. | 29 | 23.5 | sp. | 22 | 9.6 | sup. |
| 12 | 11.5 | sup. | 31 | 10.8 | inf. | 23 | 20.8 | sp. |
| 13 | 22.8 | sp. | Feb. 1 | 22.0 | nf. | 25 | 8.1 | inf. |
| 15 | 10.0 | inf. | 3 | 9.3 | sup. | 26 | 19.3 | nf. |
| 16 | 21.3 | nf. | 4 | 20.6 | sp. | 28 | 6.6 | sup. |
| 18 | 8.6 | sup. | 6 | 7.8 | inf. | 29 | 17.8 | sp. |